Exhibit 1

AVOCENT INSTALL AND DISCOVERY
PROTOCOL SPECIFICATION

DOCUMENT #590064

VERSION: 1.1

JANUARY 16, 2002

Avocent Install Discovery Protocol

Revision Chart

| Version	Primary Author(s)	Description of Version	Date Completed
0.1	Jim Shelton Brian Stewart	Initial Draft	October 25, 2001
0.2	Jim Shelton	Fixed issues from first engineering review	October 25, 2001
0.3	Jim Shelton	Fixed issues from second engineering review.	October 26, 2001
0.4	Brian S. Stewart	Added AIDP Message description section. Added Snmp Get and Snmp Get Next commands. Added a separate status codes section.	November 15, 2001
1.0	Brian S. Stewart	Changed to Version 1.0 for signature. Added Approval section.	November 26, 2001
1.1	Jim Shelton	Added final IANA approved port number	January 16, 2002

CONTENTS

1. OVERVIEW

This document describes the Avocent Install and Discovery Protocol (AIDP). Avocent network client applications use this protocol to install and discover Avocent Managed Appliances (for example: CPS, DS1800, and DSR products). Discovery is the ability to locate managed appliances on the network. This includes appliances that do not have an IP address and appliances that do have an IP address. Install is the process of setting the IP configuration of an appliance that does not have an IP address over the network.

This protocol exchanges messages via the User Datagram Protocol (UDP) documented in RFC 768 using UDP port 3211. Appliances must listen for UDP messages on this port. The AIDP protocol uses the same port number as the Avocent Secure Management Protocol (ASMP). However, the AIDP protocol is over UDP, whereas the ASMP protocol is over TCP.

The AIDP protocol also provides a few SNMP commands that allow a client to access certain MIB (Management Information Base) objects in the appliance. A MIB is a set of managed objects that define what data can be obtained from an appliance. In order to support the SNMP commands, a managed appliance must implement an SNMP agent and an enterprise MIB. When using the AIDP protocol only certain OIDs may be retrieved from the appliance. The OIDs defined in the enterprise MIB that are marked with "Discover" in the AVAILABILITY keyword may be retrieved. In addition to these specific enterprise MIB OIDs, the MIB-II OIDs sysName and sysObjectID can be retrieved from the appliance. No other OIDs are accessible through the AIDP protocol. Please refer to the managed appliance's enterprise MIB for which OIDs are marked with the "Discover" valueWhen using the AIDP protocol only certain OIDs may be retrieved from the appliance. The OIDs defined in the enterprise MIB that are marked with "Discover" in the AVAILABILITY keyword may be retrieved. In addition to these specific enterprise MIB OIDs, the MIB-II OIDs sysName and sysObjectID can be retrieved from the appliance. No other OIDs are accessible through the AIDP protocol. Please refer to the managed appliance's enterprise MIB for which OIDs are marked with the "Discover" valueWhen using the AIDP protocol only certain OIDs may be retrieved from the appliance. The OIDs defined in the enterprise MIB that are marked with "Discover" in the AVAILABILITY keyword may be retrieved. In addition to these specific enterprise MIB OIDs, the MIB-II OIDs sysName and sysObjectID can be retrieved from the appliance. No other OIDs are accessible through the AIDP protocol. Please refer to the managed appliance's enterprise MIB for which OIDs are marked with the "Discover" value.

1.1 Discovery

Discovery is accomplished when the client sends a UDP broadcast to the subnet containing the appliances. All appliances on the subnet must report their IP configuration information back to the client. Even appliances that do not have an IP address must report their Model and MAC address back to the client.
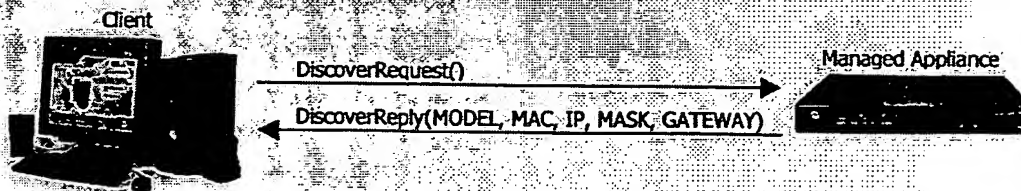
This requires that appliances that do not have an IP address be able to listen for Ethernet packets even when no IP address has been assigned to the appliance. They also must be able to create an IP/UDP reply packet when they do not have an IP address. This Discover Reply packet should fill in the following fields as indicated below if it does not have an IP address.

Ethernet source address	=	MAC address of the appliance
Ethernet destination address	=	Ethernet source address from Discover Request message
IP source address	=	"1.2.3.4"
IP destination address	=	IP source address from Discover Request message
UDP Discover Reply MAC	=	MAC address of the appliance
UDP Discover Reply IP	=	"0.0.0.0"
UDP Discover Reply Mask	=	"0.0.0.0"
UDP Discover Reply Gateway	=	"0.0.0.0"

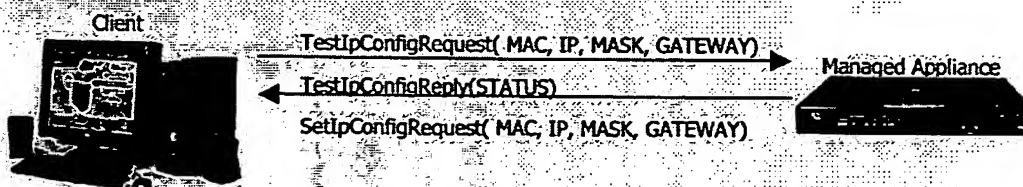Note: For details see the protocol section that follows.

Note: If an appliance already has an IP address assigned, the client can send the discover message directly to the IP address of the appliance. It does not need to send a broadcast.

Note: When operating across routers, UDP subnet broadcast must be enabled in the router for UDP port 3211.

1.2 Installation

Installation allows the client to remotely set the IP configuration of appliances that do not have an IP address. This configuration information includes the IP address, subnet mask and gateway for the managed appliance. This is a two-step process. Step 1 requires that the new configuration be tested and Step 2 installs the final IP address. Testing is required so that the appliance does not get configured with an invalid gateway or subnet mask.

During Step 1 the client sends a UPD broadcast containing the MAC address, IP address, subnet mask and gateway to the appliance. Only the appliance with the specified MAC address should reply to this request. If the reply is received, then Step 2 is performed. Step 2 permanently sets the IP configuration into the appliance.

Client
TestIpConfigRequest(MAC, IP, MASK, GATEWAY)
Managed Appliance
TestIpConfigReply(STATUS)
SetIpConfigRequest(MAC, IP, MASK, GATEWAY)

SetIpConfigReply(STATUS)

Upon receipt of a Test IP Configuration Request, an appliance with no IP address should temporarily set its IP configuration to the values received in the request. The appliance should then use the normal IP/UDP stack to send the Test IP Configuration Reply message so that the normal flow of messages is tested (subnet mask, ARP, etc). If an invalid gateway or subnet mask was specified in Step 1, the Test IP Configuration Reply message will not get returned to the client. Therefore the client will not send a Set IP Configuration Request and the appliance IP configuration information will not be permanently set. Only upon receiving the Set IP Configuration message should the appliance permanently set the IP configuration information.

2. PROTOCOL

2.1 AIDP Message

The AIDP Message is made up of a series of bytes. These bytes contain three distinct parts (Header, Record Data, and Trailer) as indicated below.

Header	Record Data	Trailer
12 BYTES	Variable Length	1 BYTE

2.1.1 Header

The AIDP Header consists of the following fields:

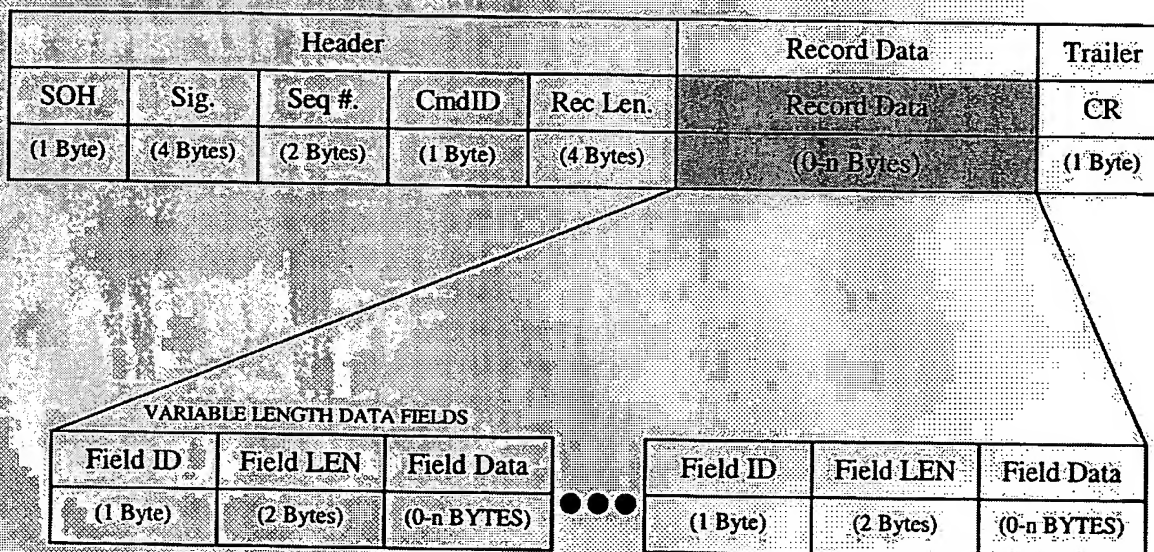| Field Name	Length	Description
SOH	1	The start flag marking the beginning of a message. Start of Heading (0x01).
Signature	4	Unique Signature ID indicating that this is an Avocent Install Discovery Protocol message. This value will always be the ASCII representation of "AIDP".
Sequence Number	2	Unique packet sequence number for ordering packets. This value increments for each packet sent. The value 0 is reserved for future use. This value is sent in Network Byte Order. Range is (1..65535).
Command ID	1	Contains the unique code for the AIDP command contained in the message. The values 0x00 and 0xFF are reserved for future use. COMMAND REQUEST ID REPLY ID Discover 0x01 0x81 TestIpConfigRequest 0x02 0x82 SetIpConfigRequest 0x03 0x83 SnmpGet 0x10 0x90 SnmpGetNext 0x11 0x91
Record Length	4	The total number of bytes in the Record Data field that follows. This value is sent in Network Byte Order. Range is (0.. 4294967295).

2.1.2 Record Data

The Record Data portion is a variable length field containing the data to send. The data is encoded based upon the AIDP command request/reply ID. See the appropriate Commands section for the specific encoding rules for the different request types.

2.1.2.1 Variable Length Data Fields

Certain AIDP commands may contain variable length data fields encoded within the Record Data portion of the AIDP message. There can be more than one variable length data field in the Record Data portion. These variable length data fields will use the following extensible record format:

Field Name	Length	Description
Field ID	1	Contains a unique Field ID for this field within the record data. A Field ID with a value of 0xFF terminates the record data and is not followed by the remainder of this field.
Field Length	2	The total number of bytes in the Field Data that follows. This value is sent in Network Byte Order. Range is (0..65535).
Field Data	0-n	Contains the data for this field.

The following shows how the Variable Length Data Fields would appear in the Record Data portion of an AIDP message:

Header					Record Data	Trailer
SOH	Sig.	Seq #.	CmdID	Rec Len.	Record Data	CR
(1 Byte)	(4 Bytes)	(2 Bytes)	(1 Byte)	(4 Bytes)	(0-n Bytes)	(1 Byte)

VARIABLE LENGTH DATA FIELDS

Field ID	Field LEN	Field Data		Field ID	Field LEN	Field Data
(1 Byte)	(2 Bytes)	(0-n BYTES)	● ● ●	(1 Byte)	(2 Bytes)	(0-n BYTES)

Note: The Variable Length Data Fields contained in the Record Data portion of the message may appear in any order, unless stated otherwise.

2.1.2.2 Variable Binding Fields

In some of the AIDP commands (specifically the Snmp commands), the Variable Length Data Fields of the Record Data may contain a Variable Binding Field. These Variable Binding Fields contain further encoding.

The following shows how the Variable Binding Field would appear in the Field Data sections of an AIDP message:

Header					Record Data	Trailer
SOH	Sig.	Seq #.	CmdID	Rec Len.	Record Data	CR
(1 Byte)	(4 Bytes)	(2 Bytes)	(1 Byte)	(4 Bytes)	(0-n Bytes)	(1 Byte)

VARIABLE LENGTH DATA FIELDS

Field ID	Field LEN	Field Data		Field ID	Field LEN	Field Data
(1 Byte)	(2 Bytes)	(0-n BYTES)	•••	(1 Byte)	(2 Bytes)	(0-n BYTES)

VARIABLE BINDING FIELD

OID Type	OID Len	OID	Value Type	Value Len	Value
(1 Byte)	(2 Bytes)	(8-n BYTES)	(1 Byte)	(2 Bytes)	(0-n BYTES)

The Variable Binding Field encoding is described below:

Sub-Field Name	Length	Description
OID Type	1	Type indicating this is an OID. Value = 0x06 (ASN_OBJECTIDENTIFIER).
OID Length	2	Contains the number of bytes in the OID that follows. This value is sent in Network Byte Order.
OID Value	8-n	Contains the OID as an array of INTS (each INT being 4 Bytes). The minimum length is 8 because the smallest OID that can be used in a command is 2 integers (example: 0.0). n has to be a multiple of 4.
Value Type	1	Contains the type of the Variable Binding Value as follows: 0x02 - ASN_INTEGER 0x03 - ASN_BITS 0x04 - ASN_OCTETSTRING 0x05 - ASN_NULL 0x06 - ASN_OBJECTIDENTIFIER 0x30 - ASN_SEQUENCE ASN_SEQUENCEOF

		0x40 - ASN_IPADDRESS 0x41 - ASN_COUNTER32 0x42 - ASN_GAUGE32 0x43 - ASN_TIMETICKS 0x44 - ASN_OPAQUE 0x46 - ASN_COUNTER64 0x47 - ASN_UNSIGNED32
Value Length	2	Contains the length of the Variable Binding Value that follows. This value is sent in Network Byte Order.
Value	0 - n	Contains the Variable Binding Value. See below for how the value is encoded.

The Value section of the Variable Binding field is encoded differently based upon the Value Type as listed below:

ASN_INTEGER (0x02)

Value Type	Value Len	Value
(1 Byte)	(2 Bytes)	(4 Bytes)

ASN_COUNTER32 (0x41), ASN_GUAGE32 (0x42), ASN_TIMETICKS (0x43)

Value Type	Value Len	Value
(1 Byte)	(2 Bytes)	(4 Bytes)

ASN_COUNTER64 (0x46)

Value Type	Value Len	Value
(1 Byte)	(2 Bytes)	(8 Bytes)

ASN_OCTETSTRING (0x04), ASN_RFC1213_DISPSTRING

Value Type	Value Len	Value			
(1 Byte)	(2 Bytes)	1 - n BYTES			
		(1 Byte)	(1 Byte)	(1 Byte)	(1 Byte)

ASN_OBJECTIDENTIFIER (0x06)

Value Type	Value Len	Value			
(1 Byte)	(2 Bytes)	1 - n INT OID values			
		(4 Bytes)	(4 Bytes)	(4 Bytes)	(4 Bytes)

ASN_NULL (0x05)

Value Type	Value Len	Value
(1 Byte)	(2 Bytes)	(NO VALUE)

2.1.3 Trailer

Every AIDP message ends with a Carriage Return (CR) byte (0x0D) to mark the end of a message

2.2 Commands

2.2.1 Discover

2.2.1.1 Request Message (0x01)

This message is sent from a Client to a Managed Appliance to request that the appliance report it's information (Model Type, MAC address, IP address, subnet mask, and gateway address).

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01
	Signature	4	Unique Signature ID. Value = "AIDP"
	Sequence Number	2	Unique packet sequence number.
	Command ID	1	Unique code for the command contained in this message. Value = 0x01 (Discover Request command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA			Variable Length Data Fields. See below for description of the specific fields.
	Field Terminator	1	Terminates the record data. Value = 0xFF
TRAILER	CR	1	End of message flag. Value = 0x0D

Note: There are no Variable Length Data Fields in a Discover Request Message. The Record Length value will always be 1 to account for the Field Terminator.

There are no Variable Length Data Fields in the Discover Request Message (0x01).

Upon receipt of the Discover Request Message, the managed appliance will generate a Discover Reply Message containing it's Model Type, MAC address, IP address, subnet mask, and gateway address.

2.2.1.2 Reply Message (0x81)

This message is sent from a Managed Appliance to a Client in response to a Discover Request message.

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01.
	Signature ID	4	Unique Signature ID. Value = "AIDP".
	Sequence Number	2	Unique packet sequence number. This number must match the sequence number of the Discover Request message that this reply is for.
	Command ID	1	Unique code for the command contained in this message. Value = 0x81 (Discover Reply command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA			Variable Length Data Fields. See below for description of the specific fields. * Field ID 1 = Appliance Model Type Field * Field ID 2 = MAC Address Field * Field ID 3 = IP Address Field * Field ID 4 = Subnet Mask Field * Field ID 5 = Gateway Address Field * Required Fields
	Field Terminator	1	Terminates the record data. Value = 0xFF.
TRAILER	CR	1	End of message flag. Value = 0x0D.

The following describes the Variable Length Data Fields of a Discover Reply Message (0x81):

Appliance Model Type Field:

Name	Length	Description
Field ID	1	The Appliance Model Type Field ID. Value = 0x01.
Field Length	2	The length of the Model Type Field Data field that follows. Value = 2. This value is sent in Network Byte Order.
Field Data	2	Value indicating the appliance model type. This value is sent in Network Byte Order. The possible values are as follows: 0x0001 - Avocent CPS810 0x0002 - Avocent CPS1610 0x0003 - Avocent DS1800 0x0004 - Avocent DSR1161 0x0005 - Avocent DSR2161 0x0006 - Avocent DSR4160 0x0007 - Compaq DSR1161 0x0008 - Compaq DSR3161

Note: This field will always appear in the message.

MAC Address Field:

Name	Length	Description
Field ID	1	The MAC Address Field ID. Value = 0x02.
Field Length	2	The length of the MAC Address Field Data field that follows. Value = 6. This value is sent in Network Byte Order.
Field Data	6	Value indicating the appliance's MAC address. This value is sent in Network Byte Order.

Note: This field will always appear in the message.

IP Address Field:

Name	Length	Description
Field ID	1	The IP Address Field ID. Value = 0x03.
Field Length	2	The length of the IP Address Field Data field that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's IP address. This value is sent in Network Byte Order. If the appliance has not been assigned an IP address yet, it should respond with an IP address of 0.0.0.0 (0x00 0x00 0x00 0x00).

Note: This field will always appear in the message.

Subnet Mask Field:

Name	Length	Description
Field ID	1	The Subnet Mask Field ID. Value = 0x04.
Field Length	2	The length of the Subnet Mask Field Data that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's subnet mask. This value is sent in Network Byte Order. If the appliance has not been assigned a subnet mask yet, it should respond with a value of 0.0.0.0 (0x00 0x00 0x00 0x00).

Note: This field will always appear in the message.

Gateway Address Field:

Name	Length	Description
Field ID	1	The Gateway Address Field ID. Value = 0x05.
Field Length	2	The length of the Gateway Address Field Data that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's gateway address. This value is sent in Network Byte Order. If the appliance has not been assigned a gateway address yet, it should respond with a value of 0.0.0.0 (0x00 0x00 0x00 0x00).

Note: This field will always appear in the message.

Note: The above Fields may appear in any order.

2.2.2 Test IP Configuration

2.2.2.1 Request Message (0x02)

This message is sent from a Client to a Managed Appliance to test if a given IP address and gateway address is valid for the appliance. It is used to determine if the appliance can route a message back to the client using the given IP and gateway addresses.

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01.
	Signature	4	Unique Signature ID. Value = "AIDP".
	Sequence Number	2	Unique packet sequence number.
	Command ID	1	Unique code for the command contained in this message. Value = 0x02 (Test IP Configuration Request command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA			Variable Length Data Fields. See below for description of the specific fields: * Field ID 1 = MAC Address Field * Field ID 2 = IP Address Field * Field ID 3 = Subnet Mask Field * Field ID 4 = Gateway Address Field * Required Fields
	Field Terminator	1	Terminates the record data. Value = 0xFF.

TRAILER	CR	1	End of message flag. Value = 0x0D.

The following describes the Variable Length Data Fields of a Test IP Configuration Request Message (0x02):

MAC Address Field:

Name	Length	Description
Field ID	1	The MAC Address Field ID. Value = 0x01.
Field Length	2	The length of the MAC Address Field Data field that follows. Value = 6. This value is sent in Network Byte Order.
Field Data	6	Value indicating the appliance's MAC address. This value is sent in Network Byte Order.

Note: This field will always appear in the message.

IP Address Field:

Name	Length	Description
Field ID	1	The IP Address Field ID. Value = 0x02.
Field Length	2	The length of the IP Address Field Data field that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's IP address. This value is sent in Network Byte Order.

Note: This field will always appear in the message.

Subnet Mask Field:

Name	Length	Description
Field ID	1	The Subnet Mask Field ID. Value = 0x03.
Field Length	2	The length of the Subnet Mask Field Data that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's subnet mask. This value is sent in Network Byte Order.

		Network Byte Order.

Note: This field will always appear in the message.

Gateway Address Field:

Name	Length	Description
Field ID	1	The Gateway Address Field ID. Value = 0x04.
Field Length	2	The length of the Gateway Address Field Data that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's gateway address. This value is sent in Network Byte Order.

Note: This field will always appear in the message.

Note: The above Fields may appear in any order.

Upon receipt of the Test IP Configuration Request Message, the managed appliance will generate a Test IP Configuration Reply Message indicating the status of the request.

2.2.2.2 Reply Message (0x82)

This message is sent from a Managed Appliance to a Client to indicate the status of the Test IP Configuration Request message.

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01.
	Signature	4	Unique Signature ID. Value = "AIDP".
	Sequence Number	2	Unique packet sequence number. This number must match the sequence number of the Test IP Configuration Request message that this reply is for.
	Command ID	1	Unique code for the command contained in this message. Value = 0x82 (Test IP Configuration Reply command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA			Variable Length Data Fields. See below for description of the specific fields. * Field ID 1 = Status Field * Required Fields
	Field Terminator	1	Terminates the record data. Value = 0xFF.

TRAILER	CR	1	End of message flag. Value = 0x0D

The following describes the Variable Length Data Fields of a Test IP Configuration Reply Message (0x82):

Status Field:

Name	Length	Description
Field ID	1	The Status Field ID. Value = 0x01.
Field Length	2	The length of the Status Data field that follows. Value = 2. This value is sent in Network Byte Order.
Field Data	2	Value indicating the status of the request. This value is sent in Network Byte Order. See status codes below for possible values.

Note: This field will always appear in the message.

Status codes:

Error	Description
NOERROR	Success, No error occurred.
IP_ADDRESS_ALREADY_EXISTS	The appliance already has an IP address.
INVALID_REQUEST	An invalid request was sent to the appliance.
APPLIANCE_ERROR	The appliance was unable to process the request do to an internal error. (For example: Out of memory, Not enough resources).

Please refer to section 2.2.6 Status Codes for a list of the status code values.

2.2.3 Set IP Configuration

2.2.3.1 Request Message (0x03)

This message is sent from a Client to a Managed Appliance to assign an IP address, subnet mask, and gateway address to the appliance.

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01.
	Signature	4	Unique Signature ID. Value = "AIDP".
	Sequence Number	2	Unique packet sequence number.
	Command ID	1	Unique code for the command contained in this message. Value = 0x03 (Set IP Configuration Request command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA	Variable Length Data Fields. See below for description of the specific fields. • Field ID 1 = MAC Address Field • Field ID 2 = IP Address Field • Field ID 3 = Subnet Mask Field • Field ID 4 = Gateway Address Field * Required Fields		
	Field Terminator	1	Terminates the record data. Value = 0xFF.
TRAILER	CR	1	End of message flag. Value = 0x0D.

The following describes the Variable Length Data Fields of a Set IP Configuration Request Message (0x03):

MAC Address Field:

Name	Length	Description
Field ID	1	The MAC Address Field ID. Value = 0x01.
Field Length	2	The length of the MAC Address Field Data field that follows. Value = 6. This value is sent in Network Byte Order.
Field Data	6	Value indicating the appliance's MAC address. This value is sent in Network Byte Order.

Note: This field will always appear in the message.

IP Address Field:

Name	Length	Description
Field ID	1	The IP Address Field ID. Value = 0x02.
Field Length	2	The length of the IP Address Field Data field that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's IP address. This value is sent in Network Byte Order.

Note: This field will always appear in the message.

Subnet Mask Field:

Name	Length	Description
Field ID	1	The Subnet Mask Field ID. Value = 0x03.
Field Length	2	The length of the Subnet Mask Field Data that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's subnet mask. This value is sent in Network Byte Order.

Note: This field will always appear in the message.

Gateway Address Field:

Name	Length	Description
Field ID	1	The Gateway Address Field ID. Value = 0x04.
Field Length	2	The length of the Gateway Address Field Data that follows. Value = 4. This value is sent in Network Byte Order.
Field Data	4	Value indicating the appliance's gateway address. This value is sent in Network Byte Order.

Note: This field will always appear in the message.

Note: The above Fields may appear in any order.

Upon receipt of the Set IP Configuration Request Message, the managed appliance will generate a Set IP Configuration Reply Message indicating the status of the request.

2.2.3.2 Reply Message (0x83)

This message is sent from a Managed Appliance to a Client to indicate the status of the Set IP Configuration Request message.

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01.
	Signature	4	Unique Signature ID. Value = "AIDP".
	Sequence Number	2	Unique packet sequence number. This number must match the sequence number of the Set IP Configuration Request message that this reply is for.
	Command ID	1	Unique code for the command contained in this message. Value = 0x83 (Set IP Configuration Reply command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA			Variable Length Data Fields. See below for description of the specific fields. * Field ID 1 = Status Field * Required Fields
	Field Terminator	1	Terminates the record data. Value = 0xFF.
TRAILER	CR	1	End of message flag. Value = 0x0D.

The following describes the Variable Length Data Fields of a Set IP Configuration Reply Message (0x83):

Status Field:

Name	Length	Description
Field ID	1	The Status Field ID. Value = 0x01.
Field Length	2	The length of the Status Data field that follows. Value = 2. This value is sent in Network Byte Order.
Field Data	2	Value indicating the status of the request. This value is sent in Network Byte Order. See status codes below for possible values.

Note: This field will always appear in the message.

Status codes:

Error	Description
NOERROR	Success, No error occurred.
IP_ADDRESS_ALREADY_EXISTS	The appliance already has an IP address.
INVALID_REQUEST	An invalid request was sent to the appliance.
APPLIANCE_ERROR	The appliance was unable to process the request do to an internal error. (For example: Out of memory, Not enough resources).

Please refer to section 2.2.6 Status Codes for a list of the status code values.

2.2.4 Snmp Get

2.2.4.1 Request Message (0x10)

This message is sent from a Client to a Managed Appliance to retrieve the value for an OID from the managed appliance.

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01.
	Signature	4	Unique Signature ID. Value = "AIDP".
	Sequence Number	2	Unique packet sequence number.
	Command ID	1	Unique code for the command contained in this message. Value = 0x10 (Snmp Get Request command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA			Variable Length Data Fields. See below for description of the specific fields. * Field ID 1 = Variable Binding Field
	* Required Fields		
	Field Terminator	1	Terminates the record data. Value = 0xFF.
TRAILER	CR	1	End of message flag. Value = 0x0D.

The following describes the Variable Length Data Fields of an Snmp Get Request Message (0x10). The variable binding contains the OID that the client wants to get the value for from the appliance. Please refer to section 2.1.2.2 Variable Binding Fields to see how Variable Bindings are encoded.

Variable Binding Field:

			Name	Length	Description
			Field ID	1	The Variable Binding Field ID. Value = 0x01.
			Field Length	2	The total number of bytes in the Variable Binding Field that follows. This value is sent in Network Byte Order.
Field Data	OID to Get		OID Type	1	Type indicating this is an OID. Value = 0x06 (ASN_OBJECTIDENTIFIER).
			OID Len	2	The length of the OID to get. This value is sent in Network Byte Order.
			OID	8-n	The OID to get the value for.
	Value of OID		Value Type	1	The type of the Value. Should always be set to 0x05 (ASN_NULL) for an Snmp Get Request Message.
			Value Len	2	Length of the Value. Should always be set to 0x0000 for an Snmp Get Request Message. This value is sent in Network Byte Order.
			Value	0	Value for the OID. Should never be a value for this field in an Snmp Get Request Message.

Note: There may be multiple Variable Binding Fields in an Snmp Get Request Message.

Note: When using the AIDP protocol only certain OIDs may be retrieved from the appliance. The OIDs defined in the enterprise MIB that are marked with "Discover" in the AVAILABILITY keyword may be retrieved. In addition to these specific enterprise MIB OIDs, the MIB-II OIDs sysName and sysObjectID can be retrieved from the appliance. No other OIDs are accessible through the AIDP protocol. Please refer to the managed appliance's enterprise MIB for which OIDs are marked with the "Discover" value.

Upon receipt of the Snmp Get Request Message, the managed appliance will get the values for the OIDs specified in the variable binding values. It will then generate an Snmp Get Reply message to the client. The message will contain the status of the request and the values for the OIDs if the request was successful

The following is an example of an Snmp Get Request Message (0x10) for the MIB-II sysName OID (1.3.6.1.2.1.1.5)

SOH	Sig.	SEQ #	Cmd ID	Rec. Len	Variable Binding ID	Variable Binding Len	OID Type	OID Len
1	"AIDP"	1	16	46	1	42	6	36
01	41 53 4D 50	00 01	10	00 00 00 2E	01	00 2A	06	00 24

Header / **Record Data**

OID Value
1 3 6 1 2 1 1 5 0
00 00 00 01 00 00 00 03 00 00 00 06 00 00 00 01 00 00 00 02 00 00 00 01 00 00 00 01 00 00 00 05 00 00 00 00

Record Data (cont.)

Value Type	Value Len	Term.	Trailer
5	0	FF	CR
05	00 00	FF	0D

Record Data (cont.) / **Trailer**

2.2.4.2 Reply Message (0x90)

This message is sent from a Managed Appliance to a Client in response to an Snmp Get Request message. It will contain the status of the request and the values for the OIDs if the request was successful

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01.
	Signature	4	Unique Signature ID. Value = "AIDP".
	Sequence Number	2	Unique packet sequence number. This number must match the sequence number of the Snmp Get Request message that this reply is for.
	Command ID	1	Unique code for the command contained in this message. Value = 0x90 (Snmp Get Reply command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA			Variable Length Data Fields. See below for description of the specific fields. * Field ID 1 = Snmp Error Status Field * Field ID 2 = Snmp Get Response Error Index Field * Field ID 3 = Variable Binding Field * Required Fields
	Field Terminator	1	Terminates the record data. Value = 0xFF.
TRAILER	CR	1	End of message flag. Value = 0x0D.

The following describes the Variable Length Data Fields of an Snmp Get Reply Message (0x90):

SNMP Errror Status Field:

Name	Length	Description
Field ID	1	The SNMP Error Status Field ID. Value = 0x01.
Field Length	2	The length of the SNMP Error Status that follows. This value is sent in Network Byte Order.
Field Data	2	The SNMP Error Status. This value is sent in Network Byte Order. See the SNMP Error status codes below for possible values.

SNMP Error Status codes:

Error	Description
NOERROR	SNMP RFC1157 Error Status - No Error
TOOBIG	SNMP RFC1157 Error Status - Packet is too big
NOSUCHNAME	SNMP RFC1157 Error Status - No Such Name
BADVALUE	SNMP RFC1157 Error Status - Bad Value
READONLY	SNMP RFC1157 Error Status - Read Only
GENERR	SNMP RFC1157 Error Status – General Error
INVALID_REQUEST	An invalid request was sent to the appliance.
APPLIANCE_ERROR	The appliance was unable to process the request due to an internal error. (For example: Out of memory, Not enough resources).

Please refer to section 2.2.6 Status Codes for a list of the status code values.

SNMP GetResponse Errror Index Field:

Name	Length	Description
Field ID	1	The SNMP GetResponse Error Index Field ID. Value = 0x02.
Field Length	2	The length of the SNMP GetResponse Error Index that follows. This value is sent in Network Byte Order.
Field Data	2	The SNMP GetResponse Error Index. See RFC 1157. This value is sent in Network Byte Order. This value should be 0x0000 if the value for the SNMP Error Status Field is NOERROR, INVALID_REQUEST, or APPLIANCE_ERROR.

Variable Binding Field:

In an Snmp Get Reply message the variable binding contains the OID that was contained in the corresponding Snmp Get Request message as well as the value for the OID. Please refer to section 2.1.2.2 Variable Binding Fields to see how Variable Bindings are encoded

Name			Length	Description
Field ID			1	The Variable Binding Field ID. Value = 0x03.
Field Length			2	The total number of bytes in the Variable Binding Field that follows. This value is sent in Network Byte Order.
Field Data	OID to Get	OID Type	1	Type indicating this is an OID. Value = 0x06 (ASN_OBJECTIDENTIFIER).
		OID Len	2	The length of the OID to get. This value is sent in Network Byte Order.
		OID	8-n	The OID to get the value for.
	Value of OID	Value Type	1	Value type for the OID requested.
		Value Len	2	Length of the Value. This value is sent in Network Byte Order.
		Value	0-n	The value for the OID requested.

Note: There may be multiple Variable Binding Fields in an Snmp Get Reply Message. There should be one for every Variable Binding that was requested in the Snmp Get Request Message.

The following is an example of an Snmp Get Reply Message (0x90) that would be returned in response to an Snmp Get Request for the MIB-II sysName OID (1.3.6.1.2.1.1.5):

	Header						Record Data				
SOH	Sig.	SEQ #	Cmd ID	Rec. Len	Snmp Error ID	Snmp Error Len	Snmp Error	Var Bind ID	Var Bind Len	OID Type	OID Len
1	"ASMP"	1	144	69	1	2	0	3	60	6	36
01	41 53 4D 50	00 01	90	00 00 00 45	01	00 02	00 00	03	00 3C	06	00 24

Record Data (cont.)
OID Value
1.3.6.1.2.1.1.5.0
00 00 00 01 00 00 00 03 00 00 00 06 00 00 00 01 00 00 00 02 00 00 00 01 00 00 00 01 00 00 00 05 00 00 00 00

Record Data (cont.)				Trailer
Value Type	Value Len	Value	Term.	Trailer
4	18	"MANAGED_APPLIANCE1"	FF	CR
04	00 12	4D 41 4E 41 47 45 44 5F 41 50 50 4C 49 41 4E 43 45 31	FF	0D

2.2.5 Snmp Get Next

2.2.5.1 Request Message (0x11)

This message is sent from a Client to a Managed Appliance to retrieve the value for the next OID that is specified in a variable binding from the managed appliance.

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01.
	Signature	4	Unique Signature ID. Value = "AIDP".
	Sequence Number	2	Unique packet sequence number.
	Command ID	1	Unique code for the command contained in this message. Value = 0x11 (Snmp Get Next Request command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA	* Required Fields		Variable Length Data Fields. See below for description of the specific fields. * Field ID 1 = Variable Binding Field
	Field Terminator	1	Terminates the record data. Value = 0xFF.
TRAILER	CR	1	End of message flag. Value = 0x0D.

The following describes the Variable Length Data Fields of an Snmp Get Next Request Message (0x11). The variable binding contains the OID that the client wants to get the next value for from the appliance. Please refer to section 2.1.2.2 Variable Binding Fields to see how Variable Bindings are encoded.

Variable Binding Field:

		Name	Length	Description
		Field ID	1	The Variable Binding Field ID. Value = 0x01.
		Field Length	2	The total number of bytes in the Variable Binding Field that follows. This value is sent in Network Byte Order.
Field Data	OID to Get Next	OID Type	1	Type indicating this is an OID. Value = 0x06 (ASN_OBJECTIDENTIFIER).
		OID Len	2	The length of the OID to get next. This value is sent in Network Byte Order.
		OID	8-n	The OID to get the next value for.
	Value of OID	Value Type	1	The type of the Value. Should always be set to 0x05 (ASN_NULL) for an Snmp Get Next Request Message.
		Value Len	2	Length of the Value. Should always be set to 0x0000 for an Snmp Get Next Request Message. This value is sent in Network Byte Order.
		Value	0	Value for the OID. Should never be a value for this field in an Snmp Get Next Request Message.

Note: There may be multiple Variable Binding Fields in an Snmp Get Next Request Message.

Note: When using the AIDP protocol only certain OIDs may be retrieved from the appliance. The OIDs defined in the enterprise MIB that are marked with "Discover" in the AVAILABILITY keyword may be retrieved. In addition to these specific enterprise MIB OIDs, the MIB-II OIDs sysName and sysObjectID can be retrieved from the appliance. No other OIDs are accessible through the AIDP protocol. Please refer to the managed appliance's enterprise MIB for which OIDs are marked with the "Discover" value.

Upon receipt of the Snmp Get Next Request Message, the managed appliance will get the values for the next OIDs specified in the variable binding values. It will then generate an Snmp Get Next Reply message to the client. The message will contain the status of the request and the values for the next OIDs if the request was successful

The following is an example of an Snmp Get Next Request Message (0x11) for the MIB-II sysName OID (1.3.6.1.2.1.1.5):

	Header					Record Data		
SOH	Sig	SEQ #	Cmd ID	Rec. Len	Variable Binding ID	Variable Binding Len	OID Type	OID Len
1	"ASMP"	1	17	46	1	42	6	36
01	41 53 4D 50	00 01	11	00 00 00 2E	01	00 2A	06	00 24

Record Data (cont.)
OID Value
1 3 6 1 2 1 1 5 0
00 00 00 01 00 00 00 03 00 00 00 06 00 00 00 01 00 00 00 02 00 00 00 01 00 00 00 01 00 00 00 05 00 00 00 00

Record Data (cont.)			Trailer
Value Type	Value Len	Term.	Trailer
5	0	FF	CR
05	00 00	FF	0D

2.2.5.2 Reply Message (0x91)

This message is sent from a Managed Appliance to a Client in response to an Snmp Get Next Request message. It will contain the status of the request and the values for the next OIDs if the request was successful.

	Field Name	Length	Description
HEADER	SOH	1	Start of Heading. Value = 0x01
	Signature	4	Unique Signature ID. Value = "AIDP"
	Sequence Number	2	Unique packet sequence number. This number must match the sequence number of the Snmp Get Next Request message that this reply is for.
	Command ID	1	Unique code for the command contained in this message. Value = 0x91 (Snmp Get Next Reply command)
	Record Length	4	The total number of bytes in the Record Data field that follows.
RECORD DATA			Variable Length Data Fields. See below for description of the specific fields. * Field ID 1 = Snmp Error Status Field * Field ID 2 = Snmp Get Response Error Index Field * Field ID 3 = Variable Binding Field * Required Fields
	Field Terminator	1	Terminates the record data. Value = 0xFF.
TRAILER	CR	1	End of message flag. Value = 0x0D.

The following describes the Variable Length Data Fields of an Snmp Get Next Reply Message (0x91):

SNMP Error Status Field:

Name	Length	Description
Field ID	1	The SNMP Error Status Field ID. Value = 0x01.
Field Length	2	The length of the SNMP Error Status that follows. This value is sent in Network Byte Order.
Field Data	2	The SNMP Error Status. This value is sent in Network Byte Order. See the SNMP Error status codes below for possible values.

SNMP Error Status codes:

Error	Description
NOERROR	SNMP RFC1157 Error Status - No Error.
TOOBIG	SNMP RFC1157 Error Status - Packet is too big
NOSUCHNAME	SNMP RFC1157 Error Status - No Such Name
BADVALUE	SNMP RFC1157 Error Status - Bad Value
READONLY	SNMP RFC1157 Error Status - Read Only
GENERR	SNMP RFC1157 Error Status – General Error
INVALID_REQUEST	An invalid request was sent to the appliance.
APPLIANCE_ERROR	The appliance was unable to process the request due to an internal error. (For example: Out of memory, Not enough resources).

Please refer to section 2.2.6 Status Codes for a list of the status code values.

SNMP GetResponse Errror Index Field:

Name	Length	Description
Field ID	1	The SNMP GetResponse Error Index Field ID. Value = 0x02.
Field Length	2	The length of the SNMP GetResponse Error Index that follows. This value is sent in Network Byte Order.
Field Data	2	The SNMP GetResponse Error Index. See RFC 1157. This value is sent in Network Byte Order. This value should be 0x0000 if the value for the SNMP Error Status Field is NOERROR, INVALID_REQUEST or APPLIANCE_ERROR.

Variable Binding Field:

In an Snmp Get Next Reply message the variable binding contains the next OID for the one that was contained in the corresponding Snmp Get Next Request as well as the value for the next OID. Please refer to section 2.1.2.2 Variable Binding Fields to see how Variable Bindings are encoded

		Name	Length	Description
		Field ID	1	The Variable Binding Field ID. Value = 0x03.
		Field Length	2	The total number of bytes in the Variable Binding Field that follows. This value is sent in Network Byte Order.
Field Data	Next OID	OID Type	1	Type indicating this is an OID. Value = 0x06 (ASN_OBJECTIDENTIFIER).
		OID Len	2	The length of the next OID. This value is sent in Network Byte Order.
		OID	8-n	The next OID.
	Value of Next OID	Value Type	1	Value type for the next OID requested.
		Value Len	2	Length of the Value. This value is sent in Network Byte Order.
		Value	0-n	The value for the next OID requested.

Note: There may be multiple Variable Binding Fields in an Snmp Get Next Reply Message. There should be one for every Variable Binding that was requested in the Snmp Get Next Request Message.

The following is an example of an Snmp Get Next Reply Message (0x91) that would be returned in response to an Snmp Get Next Request for the MIB-II sysName OID (1.3.6.1.2.1.1.5):

SOH	Sig.	SEQ #	Cmd ID	Rec. Len	Snmp Error ID	Snmp Error Len	Snmp Error	Var Bind ID	Var Bind Len	OID Type	OID Len
1	"ASMP"	1	145	64	1	2	0	3	55	6	36
01	41 53 4D 50	00 01	91	00 00 00 40	01	00 02	00 00	03	00 37	06	00 24

Record Data (cont.)
OID Value
1 3 6 1 2 1 1 6 0
00 00 00 01 00 00 00 03 00 00 00 06 00 00 00 01 00 00 00 02 00 00 00 01 00 00 00 01 00 00 00 06 00 00 00 00

Value Type	Value Len	Value	Term.	Trailer
4	13	"ENG_BUILDING1"	FF	CR
04	00 0D	45 4E 47 5F 42 55 49 4C 44 49 4E 47 31	FF	0D

2.2.6 Status Codes

Below is a list of all the status codes that exist for the AIDP protocol. To see the status codes that can be returned by a specific AIDP message, please refer to the Commands section.

Status Code	Error	Description
0x0000	NOERROR	SNMP RFC1157 Error Status - No Error
0x0001	TOOBIG	SNMP RFC1157 Error Status - Packet is too big
0x0002	NOSUCHNAME	SNMP RFC1157 Error Status - No Such Name
0x0003	BADVALUE	SNMP RFC1157 Error Status - Bad Value
0x0004	READONLY	SNMP RFC1157 Error Status - Read Only
0x0005	GENERR	SNMP RFC1157 Error Status – General Error
0x0006	INVALID_REQUEST	An invalid request was sent to the appliance.
0x0007	APPLIANCE_ERROR	The appliance was unable to process the request due to an internal error. (For example: Out of memory, Not enough resources).
0x0008	IP_ADDRESS_ALREADY_EXISTS	The appliance already has an IP address.

3. APPROVAL

This Protocol Specification requires the approval of each of the individuals listed below. By signing below, each member acknowledges that they understand and agree with the design documented herein and presented in a Design Review.

[signature] 1/16/02

S/W Technical Lead   Date

[signature] Steven W. Clark 1/16/02

Design Team Member   Date

[signature] Brian S. Stewart 1/16/02

Design Team Member   Date